REMARKS

Reconsideration and favorable allowance of the present application is respectfully requested. Applicant also would like to thank the Examiner for his indication that claim 33 is allowed.

ELECTION/RESTRICTIONS

1. In the present Office Action, the Examiner considers the elected claims to include only claims 33-35, and 66-69, based on the reading that the "superradiation devices" in the specification are only described as "diode like" or "electroluminescent like", and are not "diode" or "electroluminescent". Thus, the "superradiation devices" form a distinct group. As such, the claims reciting "superradiation" (claims 21-23, 26-29 and 32) are not entitled to examination.

Also, according to the Examiner, the dependent claims which indicate that the superradiation device is an LED should be re-stated as "give an LED like output," not that they are an LED.

In response to the Examiner's indication, Applicant respectfully submits that both LED and EL are described as a part of the superradiation devices, and respectfully directs the Examiner to the description of Embodiment 9 in the Specification (Specification, page 57, lines 16-24; page 60, lines 14-17), where EL and LED are described as being able to achieve superradiation. It seems that the Examiner has misinterpreted a super luminescent diode (SLD) to be the only superradiation device, whereas SLD is merely one of the devices that can achieve superradiation. (Specification, page 43, lines 7-12). LED and EL devices are examples of devices that can also achieve superradiation. Therefore, claims 21-23, 26-29 and 32 should be entitled examination.

2. Further, Applicant respectfully requests the Examiner to reconsider the examinability of claims 59, 60, 64 and 65, as amended, since they are dependent on claims 66-69:

Claim 59, whose optical switch is digital micro-mirror device, is dependent on claims 66, 68 and 69.

Claim 60, whose array shape of the light source is a curved surface, is dependent on claims 66, 67, 68, and 69.

Claim 64, whose optical switch is a liquid crystal panel or a reflection type liquid crystal panel, is dependent on claims 66, 68 and 69.

Claim 65, where the array shape of the light source and the utilization shape of the optical switch are similar, is dependent on claims 66, 68 and 69.

REJECTIONS UNDER SEC. 112, SECOND PARAGRAPH.

The Examiner has rejected claims 34-35 and 66-69 under 35 USC Sec. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The Examiner queries the meaning of the term "in time sharing," since the term seems to have no known meaning as used.

In response to the Examiner's query, Applicant first notes that the term "in time sharing" appears in the Specification on page 49, lines 21, 24. In that context, the term is used to indicate that beams of different wavelength are outputting in turn and in time-division fashion (e.g. Page 33, line 17).

The Examiner also queries the meaning of the term "parallel conversion." The Examiner assumes it means "collimation" and has examined the claims accordingly. In response to the Examiner's query, Applicant respectfully submits that the term indeed means collimation. (e.g. Fig. 1, numeral 60).

REJECTIONS UNDER SECTION 102

The Examiner has rejected claims 34-35 and 66-69 as being clearly anticipated by Yamamoto, et al. (USP No. 5,506,705) (hereinafter "Yamamoto"). According to the

Examiner, Yamamoto discloses a field sequential device with LED's and collimation, thus anticipating the claims.

The cited Yamamoto is directed to a goggle type display apparatus for use with virtual reality ("VR") applications. Yamamoto's goggle has an image formation means, e.g. a screen, for each of a user's eyes. The image formation means comprises light polarization means for polarizing light from a light source, and reflection-type display means which includes a substrate, switching means formed on the substrate, a display medium for modulating the polarized light and an electrode layer.

1. With respect to claims 34-35, Yamamoto does not disclose a luminous device that is composed of "arrayed light sources outputting beams of different wavelengths in time-sharing" fashion. Yamamoto discloses only a single lamp (Num. 5 of Fig. 4 and Num. 34 of Fig. 7) that has to be applied to a color sequential filter (Num. 23 of Fig. 4 and Num. 36 of Fig. 7) in order to convert light emitted from the lamp to R, G, B colors sequentially. (Yamamoto, col. 10, lines 60-63; col. 13, lines 4-6). The present invention does not employ such color sequential filter to generate R, G, B colors from a single source; instead, an array of light sources of different wavelengths is used in time-sharing fashion.

Further, with respect to claims 66-69, Yamamoto does not disclose a luminous device composed of "arrayed plural electro-luminescent element or arrayed plural light emitting diode elements" for the same reasons as stated above.

2. Comparing a plurality of light source elements (arrayed light sources, arrayed plural EL elements or LED elements) of the present application to a single light source (single lamp) of Yamamoto, the present application has a great advantage over Yamamoto. Specifically, if a beam from the single light source element is distributed and overlapped after the distributed beams pass different light paths, a spatial interference pattern, i.e. a speckle pattern, is likely to be generated, which deteriorates the quality of display images. This problem becomes more critical in the case of a point light source than in the case of a lamp light source, as the coherence increases.

On the contrary, when a plurality of light source elements is applied (or arrayed), it will be difficult for beams from the plurality of light source elements to spatially interfere even when they have the same wavelengths, which effectively deters the generation of speckle pattern. This is because beams between independent light sources are difficult to interfere with each other. Further, even when it is generally defined that light wavelengths are equivalent, each wavelength from each light source element, such as LED, EL, and LD, is not the same, in the strict sense. As such, as each wavelength from each light source element is different, the speckle pattern is even more difficult to generate. Regarding the speckle pattern reduction or the speckle pattern generation deterrence, it has been discussed in the Specification as the case relating to LD (Page 31, lines 8-23).

3. Comparison between claims 34, 35, 66-69 and Yamamoto:

Means fro supplying primaries, red (R), green (G) and blue (B), is essential for an image display apparatus. In Yamamoto, the color-separation-supply-system, in which primaries R, G, and B are separated from a single light source (lamp) and supplied, is disclosed as a primaries supply method. The color-separation-supply-system and a spatial color-separation-supply system are highlighted as follows: (each of which includes methods for primaries separation utilizing a color filter.)

Temporal (sequential) color-separation-supply-system:

(a) a luminous flux output from a white light source 5 is projected onto a color filter 23 which can be switched based on voltage, and a color separation into primaries is performed by temporal switching . (Yamamoto, Fig. 4)

(b) onto a luminous flux part output from a white light source 34, a rotation color filter 40 which is spatially divided into three color parts is projected in order, by which a temporal color separation into primaries is performed. (Yamamoto, Fig. 10)

Spatial color-separation-supply-system:

(c) a luminous flux from a white light source 34 is spatially divided by a fiber 35, a color separation into primaries is performed by color filters 36a, 36b, and 36c provided at the exits of the fiber 35. (Yamamoto, Figs. 7 and 8)

(d) a luminous flux from a white light source 34 is focused by three lenses 38a, 38b, and 38C which are spatially and separately located, and each of the focused one is led to a color filter through each fiber 38d, 38e, and 38f so as to perform primaries color separation (Yamamoto, Fig. 9)

In the present application, such color-separation-supply-systems, i.e. a method utilizing a dichroic mirror (Fig. 31) and a method utilizing a rotation color filter (Fig. 85), are already described as prior art.

The invention in accordance with the present application does not use the above-mentioned color-separation-supply-system. In the present application, an image display apparatus where illuminants of three types generating primaries are used as light sources is described. This light source system (the primaries-illuminant-light-source-system) utilizing illuminants generating primaries (described in Fig. 1, Fig. 9, Fig. 10, Fig. 11, Fig. 13, and Fig. 76 [explained using EL, but LED can also be applied], and Fig. 84) is significant. This primaries-illuminant-light-source-system has the following advantages, which cannot be achieved by the color-separation-supply-system utilizing a single light source. The primaries-illuminant-light-source-system is not limited to the primaries of R, G, and B. For example, white can be added as one of primaries. Therefore, primaries-illuminant-light-source-system can be called a plural-colors-illuminant-light-source-system.

a) Simplicity. In the color-separation-supply-system such as Yamamoto, wherein a color separation element such as a dichroic mirror or a dichroic prism is indispensable, the optical system has a complicated configuration. Quite to the contrary, the primaries-illuminant-light-source-system has a simple optical system. Thus, a good

display apparatus which is downsized, weight-reduced, and inexpensive, and has a good energy utilization rate can be obtained.

b) Flexibility. The final image of the image display system is produced by synthesizing images of primaries. The color supply system influences on a selection of the color synthesis method.

For the color-separation-supply-system case: In the temporal (sequential) color-separation-supply-system, the color synthesis is automatically performed by time division: time-division-color-synthesis-system (that is a so-called Color Field Sequential). In the spatial color-separation-supply-system, a spatial-division-color-synthesis-system wherein each beam or R, G, and B is induced and divided into a sub-pixel, and overlapped at the same time, which is excellent in brightness, is naturally selected.

Quite to the contrary, in a primaries-illuminant-light-source-system, it is possible to select either the time-division-color-synthesis-system or the spatial-division-color-synthesis-system, which broadens design selection of the apparatus. The reason is that since a solid illuminant element, such as LED, EL, and LD, has a high response speed and can be well controlled, it is possible to control the radiation in both cases of the time-division-color-synthesis system and the spatial-division-color-synthesis-system.

For instance, in the time-division-color-synthesis-system, where the system can be made of one panel (e.g. Specification, Figs. 44, 45, 55, 57 and 58), the down-sized, weight-reduced, and inexpensive apparatus system can be realized, though a high response speed of three time is necessary for the optical switch. On the other hand, the spatial-division-color-synthesis-system (e.g. Japanese Unexamined Patent Application 9-318942 by the present assignee, Mitsubishi Denki) is meritorious in that a high-speed optical switch is unnecessary though a sub-pixel becomes necessary. Thus, an optical system depending upon an apparatus specification can be designed, which enhances design freedom.

NEW CLAIMS

Applicant has added new claims 70-73, which are directed to a plural-colors-illuminant-light-source-system composed of a plurality of light source elements (e.g. LED, EL and LD), and are dependent from the array light source of claims 34, 35 and 66-69.

CONCLUSION

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact the undersigned at (703) 205-8000 to conduct an interview in an effort to expedite prosecution in connection with the present application.

Pursuant to 37 C.F.R. §§ 1.17 and 1.136(a), applicants hereby petition for an extension of time for one (1) month to December 30, 2002, December 29 being Sunday, for filing a reply to the Office Action dated August 29, 2002 in connection with the above-identified application.

If necessary, the Commissioner is hereby authorized in this, concurrent, and further replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17; particularly, extension of time fees.

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail, postage prepaid, in an envelope to: Commissioner of Patents and Trademarks, Washington D.C. 20231 on: Dec 30 2002
(Date of deposit)

BIRCH, STEWART, KOLASCH & BIRCH, LLP

Susan M. Langworthy
(Signature)

MKM/DRA/PKY Dec. 30, 2002
2565-0187P (Date of Signature)

Respectfully submitted,

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Attachment: Clean Version of all Pending Claims